

# A new genus and species of myrmecophilous aphodiine beetle (Coleoptera, Scarabaeidae) inhabiting the myrmecophytic epiphyte *Platycerium* sp. (Polypodiaceae) in the Bornean rainforest canopy

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## Abstract

*Pterobius itiokai* Maruyama, **gen. n.** and **sp. n.**, (Coleoptera: Scarabaeidae: Aphodiinae) is described from Lambir Hills National Park, Borneo based on specimens collected from a *Crematogaster diffinis* ant nest in the myrmecophytic epiphytic fern genus *Platycerium*. *Pterobius* belongs to the tribe Eupariini and is closely related to the Indo-Australian genus *Cnematoplatys*.

## Keywords

Myrmecophily, *Crematogaster diffinis*, Aphodiinae, Eupariini, *Cnematoplatys*

## Introduction

The Bornean lowland rainforest is dominated by dipterocarp trees, in whose canopies the ant, *Crematogaster diffinis* (F. Smith), is a common and predominant species in arboreal ant community (Inui et al. 2009; Tanaka et al. 2009). This ant nests under the bark of trees and in myrmecophytic epiphytic ferns *Platycerium* sp. and *Lecanopteris* sp. Roth (1995) described a myrmecophilous cockroach, *Pseudoanaplectinia yumotoi*,

which was found in the nests of *C. difformis* in the domatia of the epiphytic ferns in Lambir Hills National Park, Borneo. Recently, Dr. T. Itioka of Kyoto University collected a series of a remarkable aphodiine scarab species from a colony of *C. difformis* in the domatia of *Platycerium* sp. in the same locality, together with *P. yumotoi*. Both adults and larvae of this aphodiine were found in the nest. The unusual adult morphology was indicative of its integration in the ant society. The beetle was not able to be assigned to any known genus and species. While many myrmecophilous aphodiines are known in the Neotropics (Stebnicka 2009), none have been reported previously from Southeast Asia. This paper describes the first myrmecophilous aphodiine from Southeast Asia as a new genus and species.

### ***Pterobius* Maruyama, gen. n.**

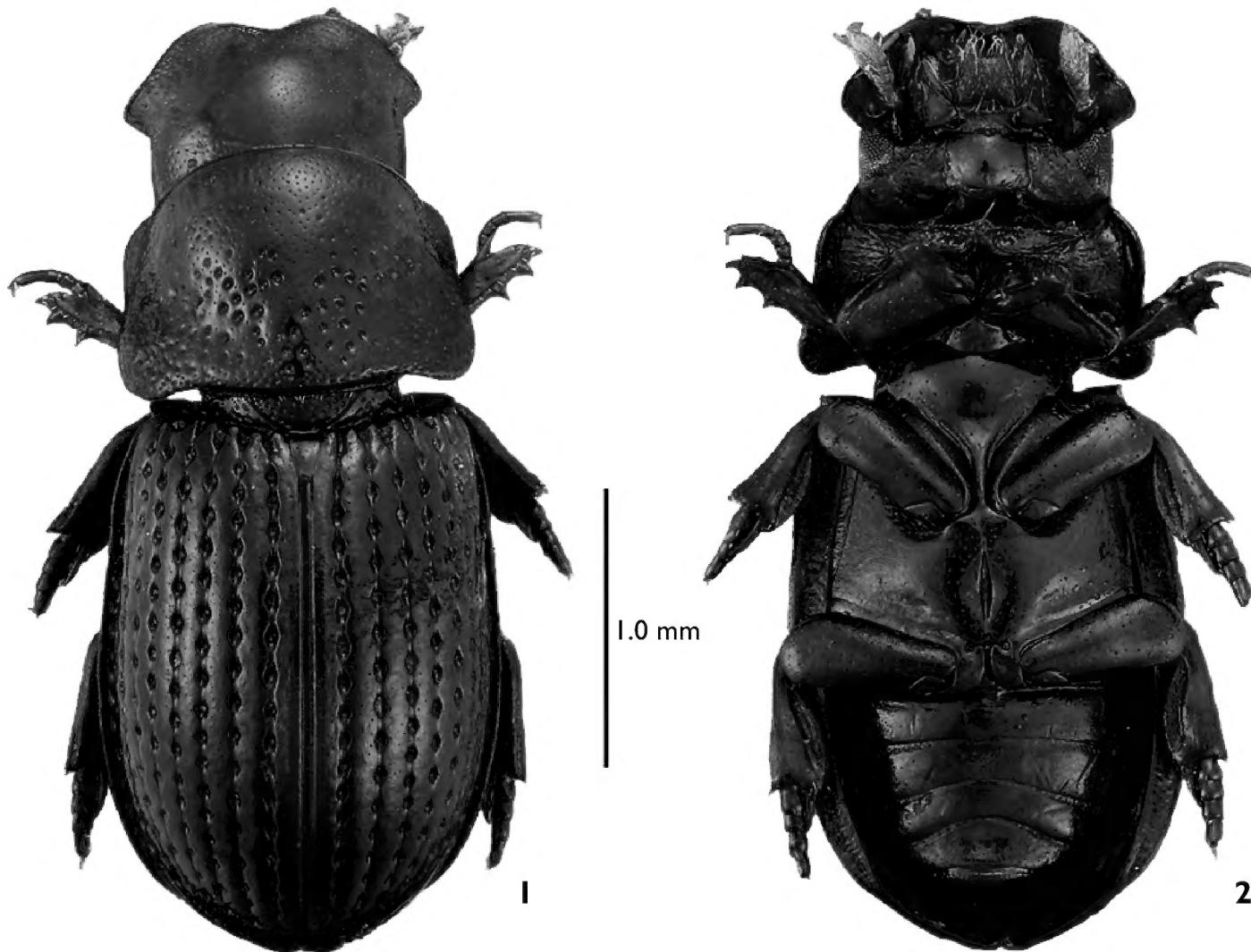
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**Type species.** *Pterobius itiokai* Maruyama, sp. n.

**Etymology.** Combination of the Greek *pteris* and *-bios*, meaning inhabitant of ferns. Gender masculine.

**Description.** Body (Figs 1–2) elongate, glabrous above; coloration reddish brown. Head large, slightly narrower than anterior edge of pronotum, strongly convex medially; clypeal margin with acutely triangular, deflexed process at middle; genae right-angled, protruding; mouthparts adapted for soft saprophagy. Antennae 9-segmented, with 3 lamellae. Pronotum evenly convex with narrowly explanate anterior half; posterior angles broadly rounded, protruding; pronotal base without marginal line; surface roughly covered with variably-sized punctures. Elytra long, strongly convex dorsally and declivous laterally, widely margined from base to apical 1/9; humerus with epipleural denticle; striae impressed, coarsely punctate; intervals smooth. Metathoracic wings functional. Venter with prosternal process very large, elevated; mesosternum unevenly convex, glabrous, shining; mesocoxae slightly separated by meso-metasternal carina; metasternum convex, lateral metasternal triangle shallow; abdominal sternites long, finely fluted along sutures, medially narrowed, sutures arch anteriorly at middle. Pygidium with deep medial groove from base to middle; disc impunctate, not eroded. Legs (Figs 5–7) short; profemur with perimarginal groove; meso- and metafemora not lobed at knee; protibia with 3 lateral teeth and stout terminal spur; meso- and metatibiae (Figs 2, 6–7) flattened dorsoventrally, deplanated inwards, widened toward apex; apical spurs large, s-curved outwards; tarsi short, stout; tarsomeres cylindrical; claws hair-like; metatarsus 4-segmented. Epipharynx (Fig. 3) characteristic for Eupariini. Male genitalia are weakly differentiated among species of Eupariini and are generally similar in shape to species of *Saprosites*.

**Remarks.** This genus is similar to *Cnematoplatys* Schmidt in general appearance, but it is easily distinguishable from it by the posterior angles of the pronotum that are broadly rounded and protruding, the widely margined elytra, the meso- and metatibiae widened toward the apex, the stout tarsi, and the 4-segmented metatarsus.



**Figures 1–2.** Habitus of *Pterobius itiokai*, new genus and species (paratype). **1** dorsal view **2** ventral view.

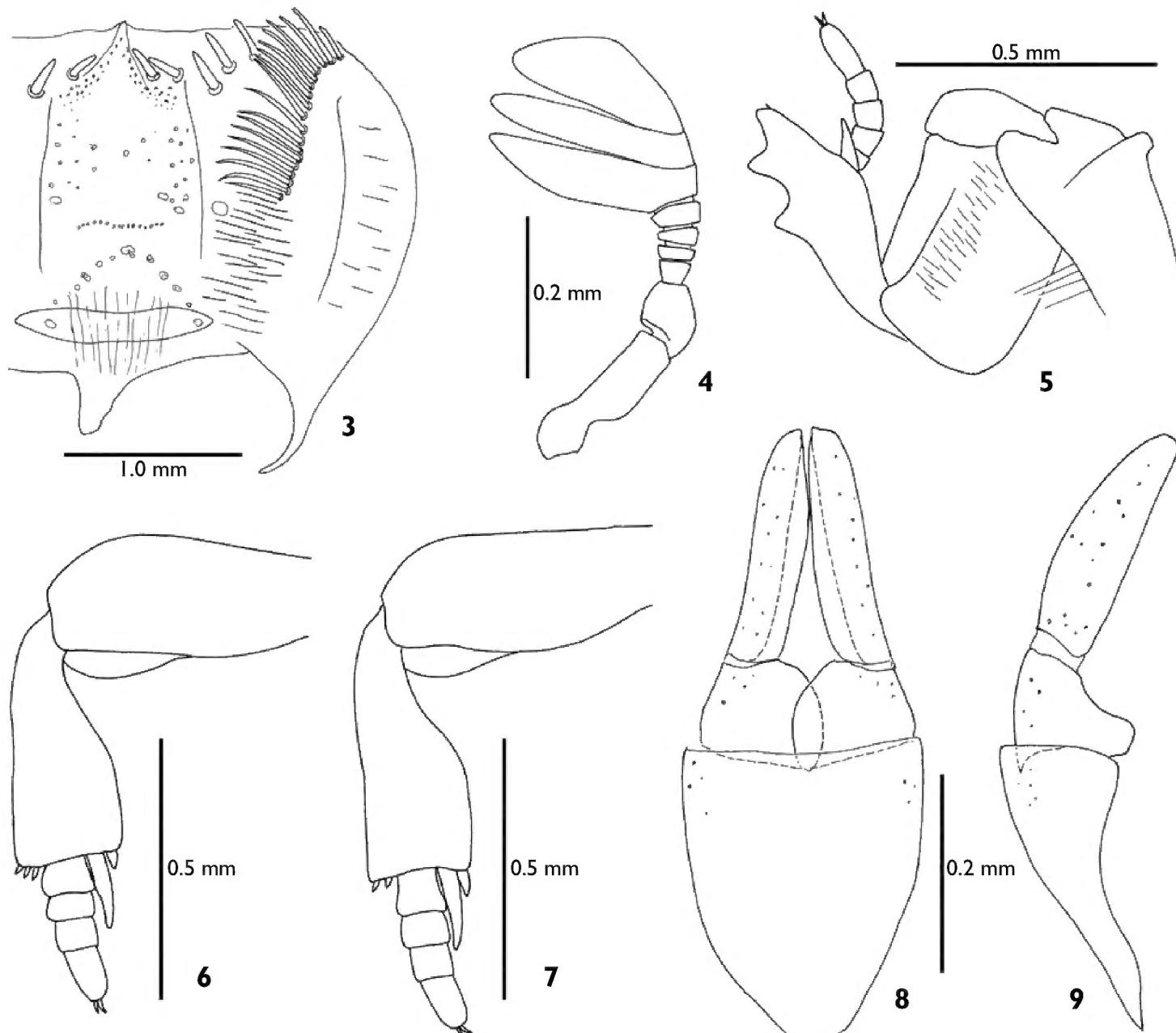
***Pterobius itiokai* Maruyama, sp. n.**

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**Etymology.** Dedicated to the collector of the type series. Dr. Takao Itioka.

**Type series.** *Holotype*, male, “MALAYSIA: Sarawak, Taman Negara Bukit Lambir [Lambir Hills National Park], 16.IX.2005, leg. ITIOKA-K.” Mouthparts, left legs and genitalia dissected and mounted on a small glass slide pinned under the specimen. Deposited at the Forest Department of Sarawak, Malaysia. Six paratypes with same data as holotype (deposited in the Kyushu University Museum).

**Description.** Length 3.05–3.30 mm. *Body* (Figs 1–2) elongate oval, reddish brown, glabrous shining. *Head* strongly gibbose medially; clypeal margin narrowly reflexed, broadly rounded on each side of shallow, median emargination; sides distinctly emarginate in front of right-angled, protruding genae; clypeal surface densely and finely punctate, with microreticulations. *Pronotum* rectangular, convex, side margin narrowly deplanate; posterior angles broadly rounded; surface punctures variably-sized, coarse and deep mesally, separated by 1–3 times their diameters. *Scutellum* narrowly subtriangular. *Elytra* slightly wider than base of pronotum and about 2.3 times as long



**Figures 3–9.** *Pterobius itiokai*, new genus and species (holotype). **3** epipharynx **4** left antenna, ventral view **5** foreleg, dorsal view **6** middle leg, dorsal view **7** hindleg, dorsal view **8** aedeagus, dorsal view **9** aedeagus, lateral view.

as pronotum, epipleural margin slightly reflexed, forming obtuse tooth at shoulder; striae finely impressed, strial punctures coarse, deep; intervals slightly convex, smooth, impunctate. Ventral sclerites shining; mesosternum gibbose and smooth in anterior half, posterior half concave, finely and sparsely punctate, at middle with triangular, smooth convexity prolonged to metasternum; metasternum convex, midline fine; surface finely and sparsely punctate; abdominal sternites with fine fluting along sutures and smooth, impunctate surface including that of pygidium. Legs (Figs 5–7) short; all femora sparsely and finely punctate; profemur subquadrate; meso- and metafemora with posterior lines; metatarsus stout, 2/3 times as long as tibia.

*Male.* Penultimate abdominal sternite and disc of pygidium shorter than female; aedeagus as in Figs 8–9.

**Remarks.** This species is similar to species of the genus *Cnematoplatys* in general appearance but are easily distinguished from them by the margined elytra, the thick meso- and metatarsi, and the 4-segmented metatarsi.

## Discussion

*Pterobius* is similar to the Indo-Australian genus *Cnematoplatys* of the tribe Eupariini in general appearance and in sharing the following character states: head large and strongly gibbose, genae acutely prominent; tibiae broad, flattened; tarsomeres of meso- and metatarsi stout; and abdominal sutures anterior. In her revision, Stebnicka (2006) stated that *Cnematoplatys* belongs to a group of related euparine genera including the Gondwanan *Saprosites* Redtenbacher, the Neotropical *Iguazua* Stebnicka, and *Passaliolla* Balthasar. These genera share a number of similar characters with *Pterobius*, which should belong to this group of genera. Nevertheless, *Pterobius* displays several unique character states that distinguish it as a distinct genus, especially the thick meso-metatarsi and the 4-segmented metatarsi. *Pterobius itiokai* is a myrmecophilous species living inside of the host ant nest, whereas the species of *Cnematoplatys*, *Iguazua*, and *Passaliolla* are found under the bark of rotten logs and on dead trunks of large trees. Thickened and shortened (including reduction of segment) tarsi are commonly found in a variety of myrmecophilous and termitophilous beetles such as of Paussinae (Carabidae), Staphylinidae, and Scarabaeidae. This is considered to be a morphological adaptation to integrate into ant society. In the case of *Pterobius*, the host ant *Crematogaster difformis* is an active and aggressive ant species, and the thick tarsi of the beetle may be protection against the hosts' bite.

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